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SUBMARINE RESCUE MOORING AND SALVAGE SHIPS OF THE
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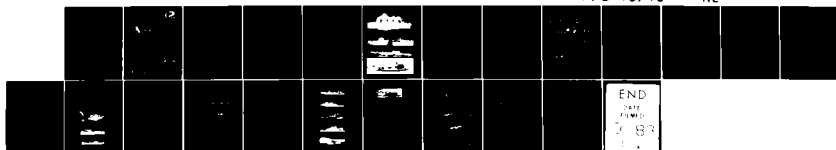
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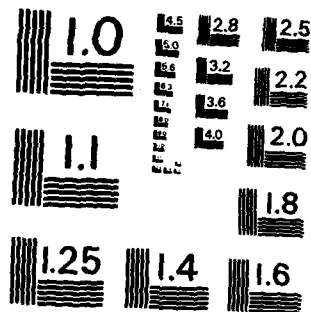
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TRANSLATION

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SHIPS OF THE SOVIET NAVY

AUTHOR: SIEGFRIED BREYER

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Submarine Rescue. Mooring And Salvage Ships of The Soviet Navy

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Equipment And Material of Soviet Naval Salvage

[Breyer, Siegfried; Soldat und Technik, D 6323 E, May 1983, Verlag Soldat und Technik, Umschau Verlag, Frankfurt am Main, pp.256 - 261; German]

The larger a fleet becomes, the more it manifests its presence on the great oceans and distant sea areas, the more important those components become for the fleet, which with the collective term "logistics" provides all the required means for its supply and assistance in extraordinary circumstances. In this regard the salvage services assume a very special role. Included in this category - merely to name a few - are submarine rescue ships, mooring (lifting) ships and fire ships. These ships perform their duties to a certain extent in the shadow of the more glamorous combat units, because in the international technical literature such ships both regrettably and inappropriately rarely receive any notice. Our veteran collaborator Siegfried Breyer examines the Soviet naval salvage activities and organization; in this regard he presents the available material first in his discussions. At the conclusion of this article, which appears in several sections, he summarizes the total capabilities of the Soviet naval salvage organization. With this article an essentially unknown chapter will be opened, which we hope may be of some advantage to our readers.

Part 1: Submarine Rescue Ships

In the history of the submarine, the development of particularly specialized submarine rescue and salvage ships assumes a definite place, although the number of such ships has been very small from the beginning until the present and has been restricted only to a few navies. Apparently this was due (and continues to be due) to the smug conviction of many navies that submarine accidents only happen to other navies, and otherwise it is cheaper to utilize civilian salvage services, if unexpectedly such an accident has occurred - in any event, this is cheaper than maintaining one or more such submarine rescue and salvage ships.

The beginnings of this ship type can be documented back to imperial Germany prior to WWI. In the context of the submarine construction which was being initiated then, funds for such a ship were allocated early, which was begun in 1907 and could be delivered already in March 1908. The ship had the name VULCAN and was a double-hull ship (catamaran) displacing ca. 2,500 tons, which consisted of two pontoon-shaped ship hulls arranged in parallel at a distance of 6.50 meters from each other, which were firmly joined to each other fore and aft by strong substructures. A crane was installed on this platform with a lifting capacity of 500 tons. Shortly prior to the beginning of WWII a second such ship, which was somewhat larger, the CYCLOP, was begun, whose lifting capacity was doubled to 1,000 tons. The second country which addressed itself to the construction of such ships was Russia. In the context of the "Small Naval Construction Program" of 23. June 1912 the funds for three such units were approved,

one each for the Baltic, the Black Sea and the Far East. Of these ships /256 only a single unit could be realized, the VOLKHOV*, because the beginning

* Except for Germany and Russia, respectively in Italy and The Netherlands (there for Spain) one such ship was built.

of WWI prevent further construction.

The VOLKHOV was built in St. Petersburg (today Leningrad) at the Putiliv Shipyard, which was redesignated as Marti Shipyard after the Bolshevik revolution, and which for some years has again resumed its original name as the Admiralty Shipyard. This ship was designed and conceived on the technical model of the German VULKAN; this was also a double-hull ship, but the displacement was somewhat increased, so that the lifting capacity could also be increased. As compared to the VULCAN, the VOLKHOV had twice the capacity, specifically, 1,000 tons within two hours at a water depth of 60 meters.

This ship, which was rechristened the KOMMUNA after the Revolution, is still in service. This November, it will be seventy years since it was launched. It emerged from the Baltic for the first time in May 1950 and displaced to Vlissingen in the Netherlands, where it has a general overhaul which lasted more than a year. In the summer of 1951 it returned to its home port Kronstadt, but was then transferred to the Black Sea several years later, where it is maintained in service to render whatever assistance of which it is still capable; in any event, within NATO it is still regarded as being operational, although on the basis of its very high age only very restricted capability can be expected of it. This ship has never been particularly conspicuous, either in WWI or WWII or in the periods before and during these wars. Information has never been released in regard to its salvage and rescue operations and what success it might have experienced. The fact that a ship such as the KOMMUNA is not used only for raising sunken submarines might well be regarded as being certain; within the parameters of its capabilities, its utilization in the raising of surface ships is probable. It would probably not have played an insignificant role after WWII in clearing wrecks in the Gulf of Finland.

The mission originally assigned to such special ships of raising sunken submarines could only have claim to priority, when the weight of the submarine to be raised corresponded to the lifting capacity. Another restriction is imposed by the particular water depth in which the object to be salvaged is located. Essentially the operation of such special ships would have to be restricted to coastal waters and in any event to littoral seas, in which great depths of water would not be encountered.

Today the emphasis is much less on the salvage of a lost submarine than on the rescue of its crew. First, current submarines are considerably larger and heavier, and secondly - as has been demonstrated in the postwar period - they tend to be lost at great water depths than in the usually shallow coastal waters. Today the emphasis is directed much more towards assisting the crew trapped in the sunken submarine. This emphasis however predicates a radically different design for such rescue ships, which for the purpose require a completely different type of equipment. Of course, such ships should be capable of performing lifting operations or to participate in such operations, but this is no longer its primary mission, but one of several.

Fig. 1: Seventy years old and apparently still operational: The submarine rescue ship KOMMUNA, which dates from the Czarist era, with its characteristic crane construction. It can be noted at the stern that this is a catamaran design. As opposed to a previously widely proliferated opinion, the KOMMUNA is not longer stationed in the Baltic but in the Black Sea.

Fig. 2: Submarine rescue ship SS35 of the T-58/ASR class, a former fleet minesweeper of the T-58 Class.

Fig. 3: Submarine rescue ship of the PRUT Class. The recompression chambers carried can be noted on the port side.

Fig. 4: Rescue submarine of the INDIA Class. It is the mother ship of two submersibles, which are carried in deck recesses behind the sail.

Fig. 5: The ELBRUS, the latest Soviet development realized in this category of ships (submarine rescue). The two cranes can be noted between the forward mast and the stack, which are used presumably for deploying and retrieving submersibles. (Note: these legends refer to photos on the following page).

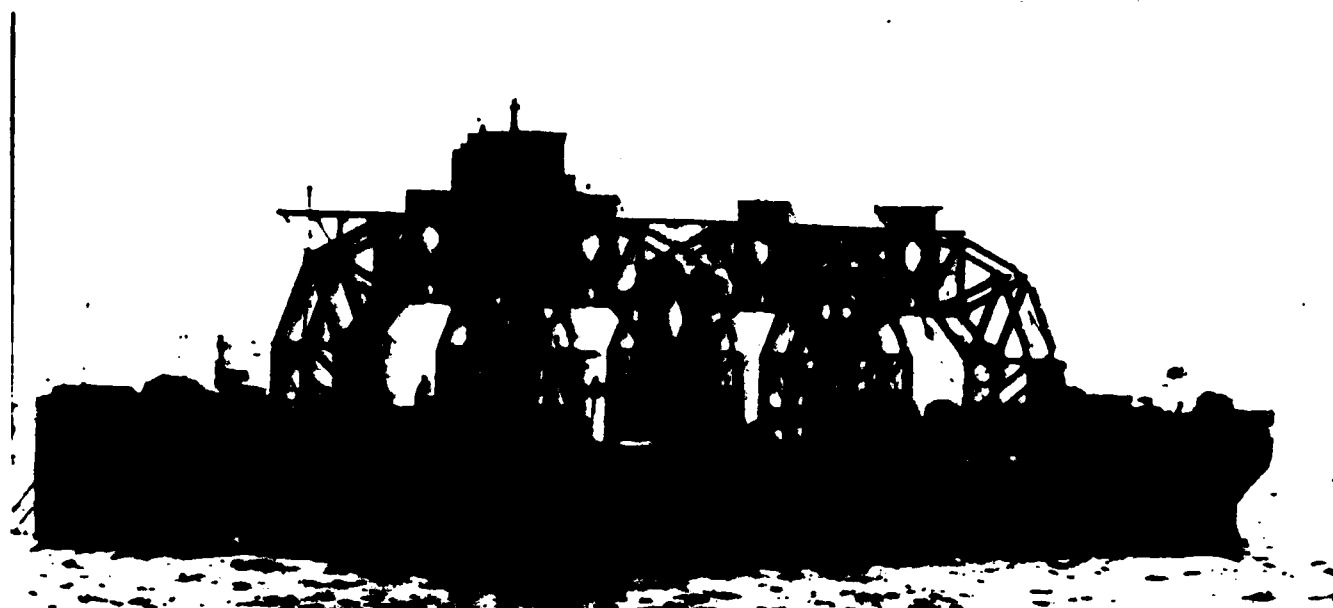
After the end of WWII, it was more than a decade until in the Soviet Union a new class of submarine rescue ships was built - this designation is derived from the NATO type designator "ASR" (for "Submarine Rescue Ship"). In the dimensions a progressive approach was used; every class was followed by a larger class, whereby the equipment became progressively more extensive, which again caused the rescue capability to increase. At the beginning of the 1980's, apparently a culmination point was apparently reached - as will be discussed later. Because the considerably increased requirement for such ships to accommodate the numbers of submarines could initially not be realized by new constructions, ships which appeared to be suitable for ASR activities were converted. The selection was made for a number of fleet minesweepers; in selecting these, the Soviets otherwise took the same route as the Americans in the 1920's, when they obtained their first submarine rescue ships by the conversion of minesweepers.

In the following this development, which extends over a period of more than thirty years, will be examined more comprehensively.

The Period of Interim Solutions

The reconstruction of the fleet which was initiated after WWII first caused a considerable expansion of the submarine forces. With the increase of the number of submarines, coincidentally the danger of accidents increased, but there was no adequate preparation or resources for this. First the attempt was made to accommodate the lack of submarine rescue ships by utilizing captured ships. In this context the German Air Force aircraft control ship HANS ALBRECHT WEDEL, which was sunk by air attack on 8. April 1945 in the Gulf of Danzig was raised and after repair was assigned to the Northern Fleet as the submarine rescue ship Khibiny.

Corresponding to the vigorous expansion of Soviet submarine forces in the 1950's and 1960's, a series of 14 units, which were begun as fleet minesweepers of the T-58 Class were converted as submarine rescue ships in Leningrad in 1961/62. In NATO this class was initially designated as the VALDAY Class after the name of the first unit which was identified; today however, this Class is designated as the T-58 (ASR) Class. In regard to technical design they correspond to the preceding T-43 (ARS) Class, which will be discussed later. What this class lacked, was installed regularly



on board the T-58 (ASR) Class, specifically a diving bell. This /258 is located on the port side amidships, where it ready for operation under a pivoting crane. In addition, decompression chambers, pumps, winches, line and hawser reels and a gantry crane located on the stern for deploying heavy equipment such a buoys, fuel supply lines, etc., are also provided. These units - of which there are now only 13 (according to Jane's Fighting Ships 1982-83 only 11) in number, after one ship was transferred already in 1971 to India, are still performing their mission today, one of which, the ex-GIDROLOG operating in the Pacific, is used as an ELINT/SIGINT ship. The names of only five ships are known; the others have an alphanumerical identification beginning with SS like the previously discussed units of the T-43 (ARS) Class. These are the following ships:

Name	Alphanumeric Identification	Assignment
VALDAY	-	Baltic Fleet
KHIBINY	-	Northern Fleet
KAZBEK	-	Black Sea Fleet
ZANGEZUR	-	Black Sea Fleet
ex-GIDROLOG	-	Pacific Fleet
-	SS-30	Baltic Fleet
-	SS-35	Baltic Fleet
-	SS-38	Baltic Fleet
-	SS-53	Baltic Fleet
-	SS-40	Northern Fleet
-	SS-47	Northern Fleet
-	SS-48	Northern Fleet
-	SS-50	Black Sea Fleet

Another unit, SS-55, was transferred to India in 1971.

From the current perspective, it has to be assumed that this Class is approaching the end of its service life. Its disposal can be anticipated in the course of this decade.

The First New Constructions

In 1958 at the then Nosenko Shipyard in Nikolayev, the construction of a series of submarine rescue ships consisting of nine units was begun. Of these ships two were commissioned each in 1960 and 1961, and in the following years one was commissioned per year until 1966. This was designated in NATO as the PRUT Class. The design goes back to shortly before the middle of the 1950's; in this regard the American CHANTICLEER Class (ASR7-18) built during WWII appears to have been the technical model. Certainly this class has a lesser displacement and smaller dimensions, but the external similarities are so apparent, that the derivation cannot be ignored. The delivery of the PRUT Class began in 1960 and continued until 1966, when the last units were commissioned.

The ships, which displace over 2,600 tons, are 90 meters long and over 13 meters in beam, received a more extensive equipment for rescue purposes and in addition are equipped for towing. Their maximum towing speed - assuming a 1,500 ton tow - would be 11 kn. In regard to rescue equipment they have:

- ▼ A rescue observation bell for one man;
- ▼ A rescue bell for three men from 60 meters;
- ▼ A rescue bell for three men from 200 meters;
- ▼ Two working caissons and
- ▼ Four large mooring buoys in addition to a number of marker buoys.

The two rescue bells and the rescue observation bell are installed below laterally positioned swivelling cranes, and the marker drums are carried in pairs on launching frames inclined to the outside, and the marker buoys behind them or inbetween, and the working caissons on the afterdeck. In addition, five to seven nozzles are provided for fighting shipboard fires.

During the 1970's the storage of the large mooring buoys was changed; until then they slid off in the longitudinal direction, so that they struck the surface of the water on their ends. Because of this turbulence probably developed, because of which they could be easily smashed against the side of the ship. In the current manner in which they are positioned, as opposed to this they roll off and retain the rolling motion after they strike the surface of the water, because of which they are carried away from the ship and can no longer endanger the ship.

Only four of the nine ships have names - of the others only the alphanumeric identification beginning with SS is known. These are the following units:

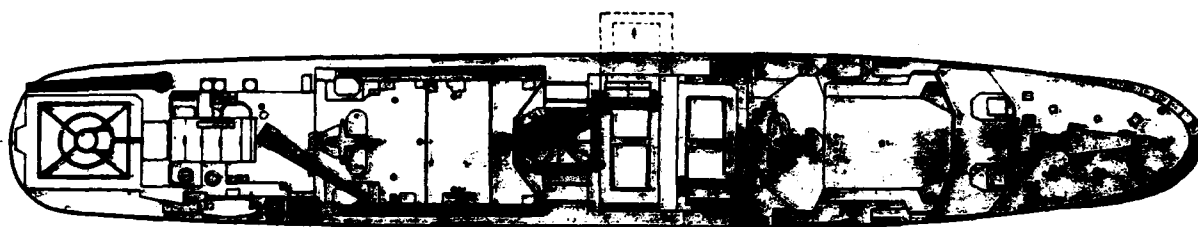
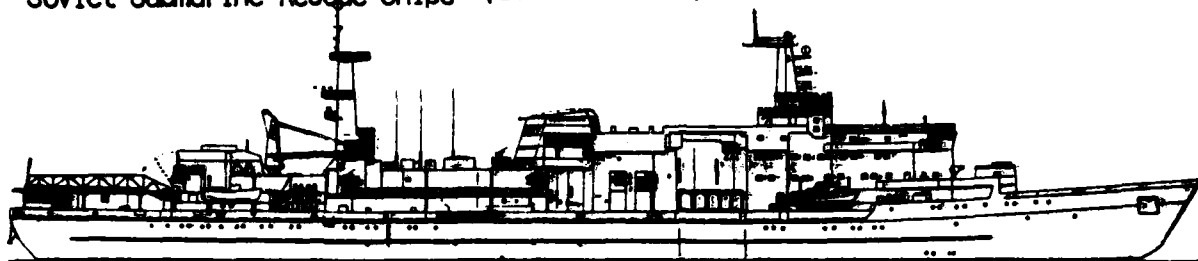
Name	Alphanumeric Identification	Assignment
ALTAY	-	Northern Fleet
BRESHTAU	ex MB-11	Northern Fleet
VLADIMIR TREFOLEV	SS-87	Baltic Fleet
ZHIGULI	-	Pacific Fleet
...	SS-44	Northern Fleet
...	SS-21 (ex MB-21)	Black Sea Fleet
...	SS-26 (ex MB-26)	Black Sea Fleet
...	SS-23 (ex MB-23)	Pacific Fleet
...	SS-83	Pacific Fleet

The concentration of the assignment can be noted from this listing: Three ships each are assigned to the Arctic Ocean and the Pacific for their areas of operation, two ships to the Black Sea and only one to the Baltic. A servicing quota who would appear to be plausible cannot be derived for the submarines assigned to each of the four fleets*.

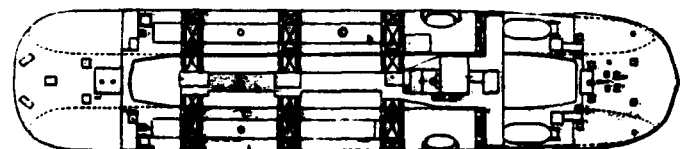
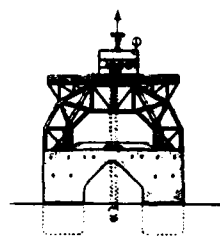
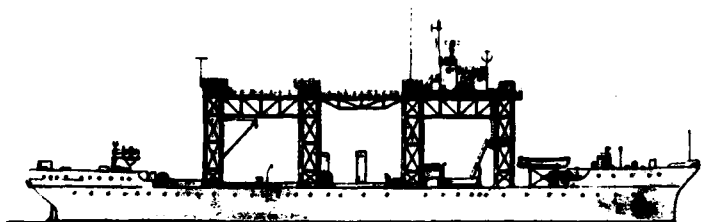
* On the basis of the submarines assigned to the individual fleets as of 1. January 1983, the following ratio would result (total number of submarines/number of the submarines accruing to a ship of the PRUT Class): Northern Fleet 184/61, Pacific Fleet 137/45, Baltic Fleet 80/80, Black Sea Fleet 64/32.

There must therefore be another distribution system, which does not necessarily have anything to do with the particular number of submarines. This is also illuminating, because ships like those of the PRUT Class are not intended exclusively for rescue operations in submarine accidents; certainly they have special equipment for such missions, but they can be employed to assist any ship in distress, when they are available to such

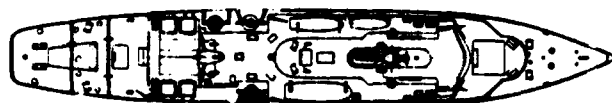
Sowjetische Ubootbergeschiffe (Maßstab 1:1000)
Soviet Submarine Rescue Ships (SCALE 1:1,000)



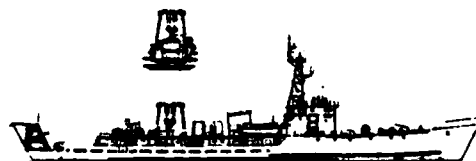
ELBRUS-Klasse
 ELBRUS CLASS



KOMMUNA-Klasse (mit vorderer Ansicht)
 KOMMUNA CLASS (WITH FRONT VIEW)



PRUT-Klasse
 PRUT CLASS



T-58/ASR-Klasse
 T-58/ASR CLASS



INDIA-Klasse
 INDIA CLASS

ships. Otherwise, when these ships have no rescue or salvage operations /259 to perform, they are used as tugboats, in order to exploit their capabilities.

New Techniques: Rescue Submarines

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At the beginning of the 1980's a new type of Soviet submarine was identified in the INDIA Class, whose NATO designator was listed as SSAG (for Submarine, Auxiliary); these submarines are quite comparable to the similarly equipped American submarines HALIBUT (SSN 587) and HAWKBILL (SSN 666), although they are intended for primarily for combat missions and carry DSRV (Deep Submergence Rescue Vehicles) sporadically in "piggyback" mode.

Of this INDIA Class two units were built in the Far East at the Amur Shipyard at Komsomolsk and were commissioned in 1979 and 1980 (v. Table 1). In this Class the sail (turret) is in pronounced forward position and; behind it the upper deck is visibly elevated and is continued parallel to the waterline far to the stern. In this desk two basin-like recesses are inserted in which each one small rescue submersible of ca. 12 meters length and 4 meters width is housed. Presumably for each of these submersibles there is a shaft access to the mother ship upon which they would have to be positioned. The personnel in the submersibles could then transfer through appropriate locks. The units of the INDIA Class - whose hulls primarily designed for surface navigation and which have conventional propulsion system - approach their operational area on the surface presumably. When they arrive, they submerge and release their submersibles, which then perform their rescue missions. The recovery on board of the submersibles occurs in the same manner; in this regard white markings before and behind the recessed basins and the forward diving planes mounted on both sides of the sail serve as orientation aids at lightless depths in order to facilitate their engaging their fastening racks.

There is no specific information available on the submersibles carried on board. More than what their external appearance reveals - and this is very little because of the lack of close-range photos - can be stated to date.

One unit of the INDIA Class is with the Pacific Fleet; the other was transferred to the Northern Fleet by the northern route. For the transfer the stem was equipped with a rather cumbersome appearing ice deflector, while the two submersible basins were covered with plates, to prevent the accumulation of ice, by which the trim could have been affected.

Submarine accidents and also the experience gained by the Americans would probably have resulted in the decision to build such rescue submarines (actually, they are mother-submarines for rescue submarines). It should not be excluded in this regard (at least it should be taken into consideration) that in this regard the American action in raising sections of the wreckage of a ballistic missile submarine of the GOLF Class, which sank after a series of explosions in the summer of 1968 in the Pacific between Hawaii and Vladivostock, could have been the actual impetus for the development of these rescue submarines. As is known, the Americans had located the wreck, which was lying at a depth of 6,000 meters, in the summer of 1974 and were able to raise sections of the submarine. It could therefore be imagined that on the Soviet side the decision was made in the event of such future submarine accidents to destroy a wreck which could no longer be salvaged with explosive charges so thoroughly, that salvage by another power would be impossible. The miniature submarines

which are carried would certainly be technically capable of placing explosive charges on a wreck effectively enough to effect its complete destruction. Or another presumption can be made: perhaps the intent is in opportune situations of sunken submarines or other ships of other countries to perform salvage operations similar to those which the Americans performed with the wreck of the GOLF Class submarine.

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Table 1: The Rescue Submarines of the INDIA Class

Number	2
Construction period	1977-1979/80
Surface displacement	3,200 tons
Submerged displacement	4,000 tons
LOA	106.6 m
Beam	10.1 m
Draft	. m
Propulsion	Diesel-electric
Surface speed	13.0 kn
Submerged speed	. kn
Crew	.
Armament	. Torpedo tubes (?)
Equipment:	. Two miniature submarines (submersibles)

Table 2: Soviet Submarine Rescue Ships (ASR)

CLASS	KOMAR	T-80 (ASR)	PROT	ELBRUS
NUMBER	1	13	9	1 (+ 1) (UNDER CONSTRUCTION)
BUILDING TIME	1970-75	1971-80	1972-80	1975-80
STANDARD DISPLACEMENT	2400	720	2100	19000
OPERATIONAL DISPLACEMENT	3140	840	2840	22000
LOA (M)	99.2	67.7	88.5	171.5
MAXIMUM BEAM (M)	22.4	9.1	13.4	24.5
NORMAL DRAFT (M)	3.6	2.3	4.3	8.5
PROPULSION	DM ^o	DM	DM	GAS TURBINES
SHAFTS	2	2	2	2
POWER KW (HP)	800 (1080)	200 (400)	800 (1080)	.
SPEED (KN)	16.0	16.0	16.0	.
FUEL (TONS)	82	110	200	.
RANGE (SM/KN)	17000	34000	.	.
CREW	100	60	120	.
ARMAMENT	NONE	NONE	NONE	NONE
EQUIPMENT	NO CRANE FORWEN	NO DIVING BEAR DECOMPRES- SION CHAMBER 1 RESCUE BELL	RESCUE OBSER- VATION BELL, 2 RESCUE BELLS, 4 LARGE MOO- RING BUOYS FIRE FIGHTING EQUIPMENT	SUBMERSIBLES DIVING GEAR, RESCUE EQUIPMENT FIRE FIGHTING EQUIPMENT

^o DM : DIESEL ENGINES

□ ONE SHIP TEMPORARILY EQUIPPED WITH 4 X 57 MM AA

CULMINATION POINT OF THE DEVELOPMENT: THE ELBRUS

In December 1981 a new Soviet auxiliary ship type attracted the attention of the technical community, as its lead ship ELBRUS coming from the Black Sea passed through the Bosphorus. Listed as BLK-AUX-1 CLASS (BLK = Black Sea Auxiliary) in NATO until this appearance and initially erroneously classified as a submarine tender*, it appeared to be the

* cf. Soldat u. Ter'mik, Vol 7/82, p. 400. The information contained there is superseded by the article and is therefore invalidated.

logical extension of a development begun in the 1950's with the tenders /260 of the DON Class. The photographic analysis however produced a surprise, which hardly could have been anticipated: this ship is not a submarine tender, but a special submarine rescue ship, which is apparently intended for operations in the hostile environment of the regions in Northern Europe and in the Far East. Therewere, where the nuclear strategic ballistic missile submarines are stationed, apparently a rather large frequency of submarine accidents is anticipated, and as well difficult conditions for providing assistance are also anticipated. For these waters the Soviets require a type ship, which in regard to its size is both seaworthy and robust, has a sufficiently great sea endurance, has special equipment appropriate for its missions in these latitudes and can be committed for rather long periods of time, insofar as possible regardless of weather conditions. One of the most important prerequisites in this regard is that these ships have to be able to tolerate the ice conditions prevailing there. Considered from this perspective, a series of ship architectural and equipment characteristics can be understood. Therefore the outer skin (outer plating) appears to be particularly strong, and in addition the outer skin is longitudinally stiffened by plates welded on the outside (which also probably serve as fenders). In conjunction with the characteristic icebreaker bow this suggests capability for ice operations. In addition to the two bow anchors there are also two heavy stern anchors; the latter are housed in recessed hawses in the stern loof. In order to stay clear pf the rudder and the propellers, protruding guides positioned obliquely astern are installed below the stern hawses. The ship would be held in position at the accident or salvage site with these four anchors in order to be able to perform the rescue operations with the greatest possible degree of precision.

A two-part lifting device is located between the forward and after mast, It consists of two gantry (portal) cranes which are arranged lying flat behind each other (with apparently longitudinally telescoping crane tackle), which can be run out approximately 8 meters on the side, whereby it protrudes ca. 5 meter on each side of the ship. The forward crane (lifting device) operates in the starboard side, the rear crane operates on the port side.

The deck superstructure housing this lifting device has in this area a base width which corresponds approximately to the width of the stack base. This means that the fixed, i.e., the upper section of the crane covers the upper deck respectively by ca. 4 meters. Below it on the upper deck the tracks run, which lead out from the deck superstructure which begins shortly behind the center of the stack. The latter (the deck superstructure) has a width of ca. 19 meters at its base and a good 15 meters in its upper section. Forward it is kept closed on each side by a two-part door (possible a folding door). The area behind it is apparently used as a hangar for heavy rescue gear which has to be handled with the crane, whereby it can be imagined that such equipment is submersibles, i.e., miniature submarines. It can be imagined that there is a lifting device by means of which this equipment and the submersibles can be maneuvered longitudinally and laterally into the whatever required position. This lifting device would be installed on the hangar deck; the two stiffener ribs which can be noted suggest this, which go around this superstructure at a distance of approximately 8 meters. The equipment (or submersibles) housed in it might be able to be placed on trolleys by means of the inside lifting device, which roll on their tracks to under the outside lifting device (crane) and then are deployed by this crane.

If miniature submarines (submersibles) are actually contained in this hangar, then this would be no surprise. Such vehicles appear to play a prominent role in the Soviet sea rescue technology, and might already have been clearly evidenced with the example of the INDIA Class. /261

What initially appeared to be aligned fenderes which could be folded away to the outside, now has to be assigned to the rescue and salvage equipment; in this regard these are cylindrical containers, apparently sealed at both ends, placed on end, which are probably containers for the buoys to mark the accident site. Five of these cylindrical containers are positioned below the crane, another three are located on the port side directly next to the the helicopter hangar. Astern, also on the port side, a lattice work structure ca. 18 meters long was installed, which resting on a rotating base, is similar to a ship crane, but is certainly not a crane. If it appeared initially that this was a system for fighting ship fires, perhaps a long fireman's ladder, now it appears that this structure is used to facilitate descent and ascent of the divers and to guide them safely through turbulence on the surface of the water or immediately below the surface of the water. This structure can apparently be extended by another section of approximately 7 meter length, because such a section is ready on the upper deck directly below it.

Upon closer examination it can be noted that the hangar and the helicopter platform are separated by a narrow but deep gap, and therefore have no continuous connection to each other. This connection is established only after the hangar door is opened, which does not swing open laterally, but which folds down and bridges this gap.

The ELBRUS also has a fire-fighting role. This can be noted in the five positions each with a water nozzle distributed over the midships, and specifically two on each side of the waist of the ship (midships) and one behind the stack in the longitudinal axis of the ship. The liferafts present - apparently of the PSN-10M type - suffice for 400 men; with some degree of certainty this exceeds the number of the crew itself.

The absence of defensive armament certainly does not mean that the ELBRUS will remain without such armament. There are four positions provided - one on each side of the after mast and two in front of the bridge complex - which would be quite suitable for the installation of the usual weapon systems - either the AK 230-AA (twin 30 mm), the ADMG 630 (30 mm Gatling) or SA-N-5 in quadruple mount.

In summary it can be said that the ELBRUS by some distance is the largest and probably the most powerful submarine rescue ship in the world: its 19,000 ton standard and 22,000 ton operational displacement are not exceeded by any other ship with comparable function. A second ship was launched at the same shipyard in 1981 and will probably become operational in the near future. Perhaps this ship is intended for the Pacific Fleet, since it appears to definite now that the ELBRUS is assigned to the Northern Fleet.

Submarine Rescue, Mooring And Salvage Ships of The Soviet Navy

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PART II: MOORING SHIPS

In Part I of this series of articles reference was already made to the KOMMUNA, that ancient submarine rescue ship which dates from Czarist times, and which is still operational today. On the basis of its design - as a double-hull ship - to date it has remained unique in the Soviet Navy, because all ships of this type which were built thereafter have the familiar characteristics of current ship design standards.

Between the two World Wars. on the basis of current information, absolutely no mooring (lifting) ships appear to have been built, because the major part of the shipbuilding industry was used for the series construction of combat ship types and there was nor capacity free for auxiliary ships. This deficiency - and such a deficiency must have been regarded as a restriction with partical reference to the urgent tasks of wreck elimination in the Black Sea and in the Baltic - could be corrected only at a rather late date, but not by their own shipbuilding industry, but by utilizing the shipyards which had remained intact or which were restored on the German Baltic coast, from which the GDR had made "volkseigene Betriebe" (People's Companies) and for the most part had operated them for the Soviet Union, because the production of these shipyards was used almost exclusively by the Soviet Union. The series construction of almost thirty mooring and salvage ships occurred in this ere, and they will be discussed more comprehensively in the following. Certainly the official Soviet type designation makes it difficult to indentify their missions specifically, but their participation in ship salvage operations, which have often been observed, eliminates any doubt in regard to their actual purpose, despite the fact that in GDR technical literature they are designated both as "buoy tenders" and as "repair ships".

FIRST POSTWAR CONSTRUCTION: THE NEPTUN CLASS

From approximately 1963 on at the Neptun Shipyard in Rostock a series of eighteen mooring tenders was built, which were delivered to the Soviet clients as follows: 1954 4 ships, 1955 2 ships, 1956 4 ships, 1957 1 ship, 1958 5 ships, 1959 2 ships. A slightly enlarged version was built in 1960 for North Vietnam. Of the previously eighteen ships, fifteen were turned over to the Navy. That item of equipment, which is both the most important for their activity and is most conspicuous, is the crane built over the bow, which has a lifting capacity of 75 tons and which is powered by a steam engine of 2 x 70 kW (2 x 95 HP) located in front of the bridge-house. With this device pieces of wrecks can be lifted, underwater work can be performed and buoys can be deployed.

The ships assigned to the Navy have a one or two-digit alphanumerical identification beginning with the letters KIL, for example KIL-3, KIL-12, etc; "KIL" means in Russian "Kilektor" (buoy tender). On the other hand, some units have received names, for example, KHERNOMORETS. Apparently, some of these ships - which are designated as the NEPTUN Class in NATO because of their building shipyard - have been eliminated because of age or obsolescence, because currently it is estimated that only thirteen or fourteen units are still in service. Because of their modest size they are suitable only for use in coastal waters and inland and litoral seas, not for the high seas.

CONVERTED MINESWEEPERS AS A PROVISIONAL SOLUTION

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The lack of mooring (lifting) ships which apparently continued to apply despite the acquisition of the NEPTUN units resulted in the conversion of fleet minesweepers of the T-43 Class, of which there were eight such conversions. These units were probably equipped with lifting gear in the second half of the 1950's. In the conversion they received three to five decompression chambers for divers (including one chamber which could be used underwater), a gantry crane hanging over the transom for handling outboard gear, diving ladders on the stern, and pumps and line and hawse winches. At least a part of these ships appears to have been diverted for training divers, and others might have been used for training mine-disposal diver teams. Currently probably only two units are still in service, whose alphanumeric identification is reported as SS-13 and SS-15; the letters SS stand for "Spasiltelnye Sudno" (rescue and salvage ships).

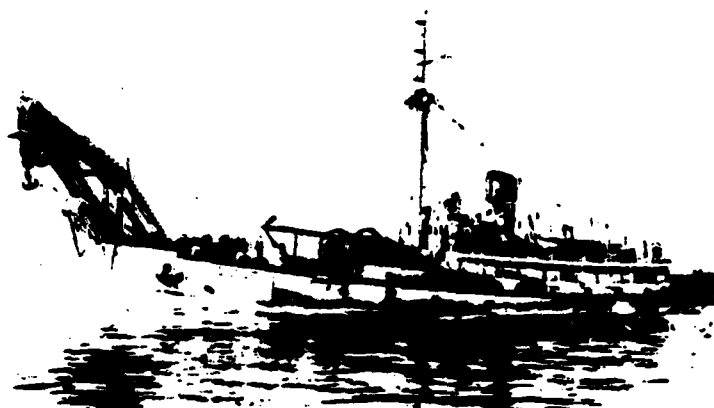


Fig. 1: Mooring tender of the NEPTUN Class

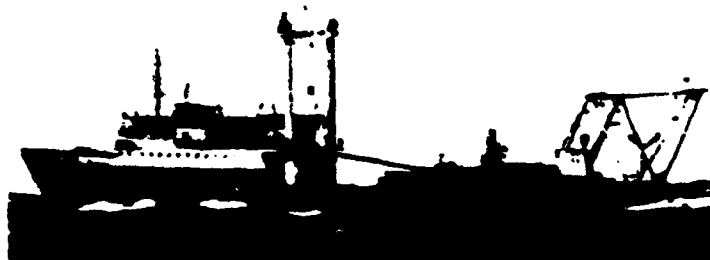


Fig. 2: Mooring tender of the SURA Class



Fig. 3: Mooring ship KARPATY (NEPA Class)

Table 3: Soviet Mooring Tenders (Lifting Ships)

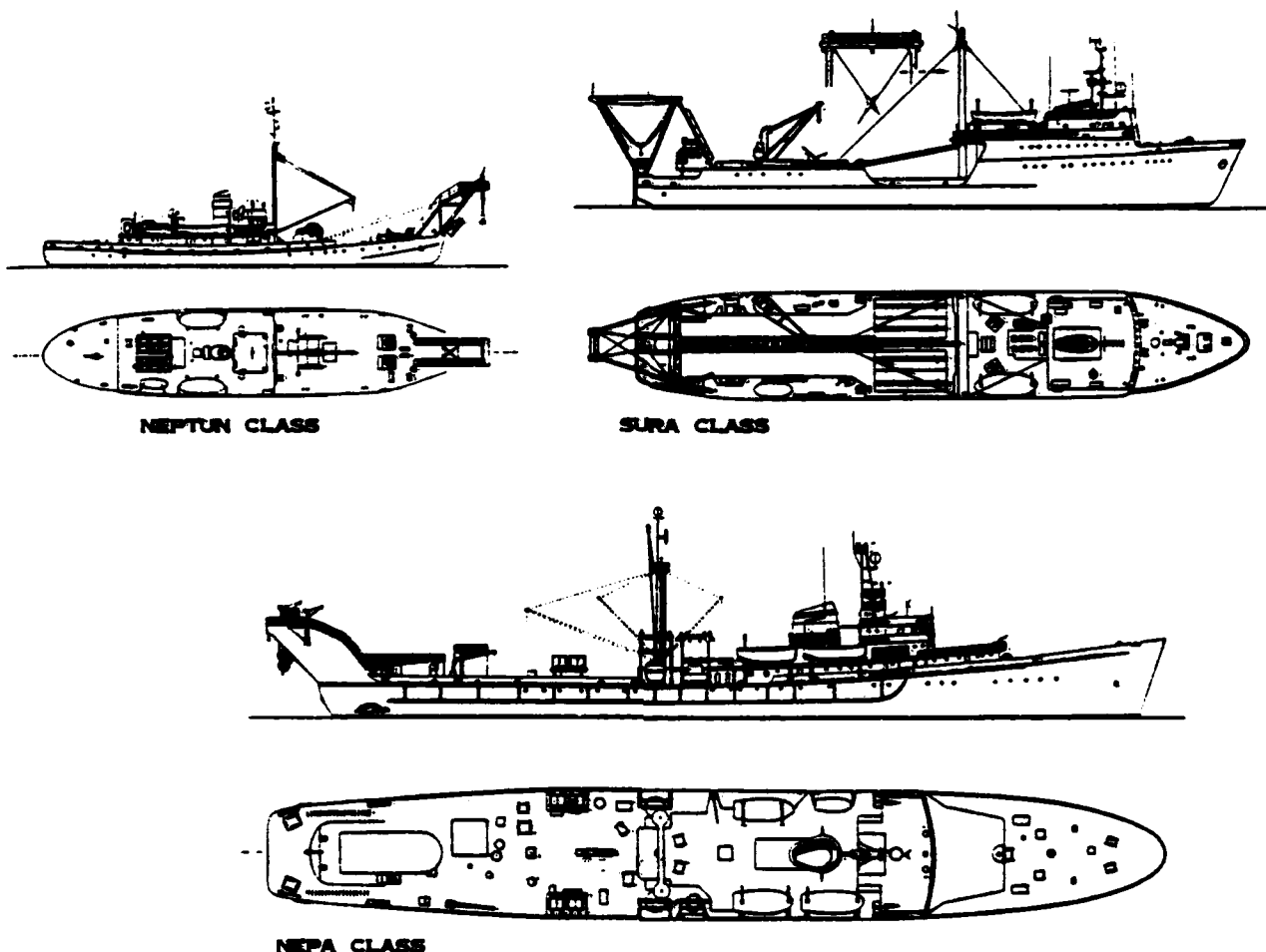
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Class	NEPTUN	T-43 (ARS)	SURA	NEPA
Number	14	2	10	1
Construction date	1953-59	1948-59	1963-75	1966-68
Standard displacement (tons)	700	500	2,370	.
Operational displacement (tons)	1,236	569	3,150	9,500
LOA (m)	57.3	58.5	87.0	130.0
Max. beam (m)	11.4	8.4	14.8	19.0
Draft (m)	3.4	2.1	5.0	6.5
Propulsion	Steam piston engines	DM	diesel-electric	DM
No. of shafts	2	2	2	2
Power kW (HP)	735 (1,000)	1620 (2,200)	1300 (1770)	5900 (8000)
Speed (kn)	11.0	14.0	13.0	18.0
Fuel (tons)	.	70	.	.
Range (sm/kn)	1,000/11	3,200/10	4,000/10	.
Crew	41	70	45	270
Armament	none	none	none	none
Equipment	75-t crane	diving gear, 3-5 decom- pression chambers	65-t crane 65-t heavy derrick 60-kW- bowthrus- ter	600-t crane 3 rescue bells 4 large mooring buoys, fire fighting equipment

LARGER AND MORE POWERFUL: THE SURA CLASS

In the first half of the 1960's, again at the Neptun Shipyard in Rostock, the construction of a new series of lifting ships (mooring tenders) began, which is designated by NATO as the SURA Class and classified as ABUD = Buoy Tender, Heavy Lift. Delivery began in 1965; until 1976 a total of ten ships were delivered, all to the Soviet Union. They are assigned to the Navy, not as generally imagined, to civilian salvage organizations. A large gantry crane is installed on the stern whose lifting capacity is 65 tons. In addition, the ships have a 65-t heavy boom available, which is suspended in split topping lifts on the portal mast installed in the center ship. The primary mission of this ship is the transport, deployment and retrieval of road anchorage equipment. In addition, they are used as tenders, and carry diesel fuel and fresh water in limited quantities for issue to other ships. It has however been noted that it can also be used for clearing wrecks, as at the beginning of the 1970's in Chittagong after the war between India and Pakistan. Such a ship, KIL-22, was also observed already in July 1969 in the Barents Sea, where together with the submarine rescue ship SS-44 of the PRUT Class and the mooring tender KARPATY (NEPA Class) it was apparently searching for and attempting to salvage a submarine which was lost there by accident in the mid-1960's. Thereby they have a ship salvage potential which should not be underestimated, which can also be used by the Navy, when it regards it as appropriate.

Fig. 4: Soviet Mooring Tenders (Lifting Ships) (uniform scale 1:1,000)



These ships, like those of the previously mentioned NEPTUN Class, also have alphanumerical identifications, which also begin with the letters KL. Unlike the units of the NEPTUN Class, these considerably larger and more seaworthy ships are quite suitable for highseas operations.

THE NEPA CLASS: COMPARABLE TO THE KOMMUNA

On October 1968, a new, previously unknown auxiliary ship emerging from the Black Sea passed through the Bosphorus. Its name could be clearly read on the hull: KARPATY. In anticipation that further ships of this type would follow, the NATO code designation NEPA Class was assigned (however, this was the only ship of this class) and was classified as ASR = Auxiliary Submarine Rescue).

The KARPATY was also built at the Nikolayev Nosenko Shipyard from 1966 to 1968. Externally it can be noted that the design is based on the PRUT Class; this is particularly conspicuous in the area of the bridge superstructures to the stack. This is also a flush-deck design, whose forward deck sheer is however less extreme than in the PRUT Class.

Such a pronounced deck sheer was not necessary, because the KARPATY /318 has a considerably higher side height and consequently also greater freeboard heights, because of which it probably takes very little water on board with the foreship. On both sides of the hull - somewhat in the manner of a lattice work - numerous stiffener ribs are inserted between the fender and the reinforced upper deck edge. The intent of this system is to prevent damage to the outer skin of the hull when going alongside other ships; coincidentally the intent might be to increase the longitudinal strength, in order to prevent deflection (bending) - perhaps when operating the crane installed on the stern with heavy weights.

Unlike the PRUT Class, the KARPATY is designed as an all-purpose salvage ship and in addition has the standard submarine rescue equipment installed. Its identifying very conspicuous feature is its crane construction which is built over the stern, resembles a hump, is fully enclosed and in the upper section has a tunnel-like design, which reportedly has a 600-ton lifting capacity. The large portal mast, which is installed almost in the centerline, has a certain similarity with that on the ships of the SURA Class, but three booms (derricks) are attached to it. On the starboard side there are two rescue bells under a pivoting crane, a one-man observation rescue bell, also under a pivoting crane, is located on the opposite side. These rescue bells are reported to have a depth capability of 450 meters. Further astern - as on the ships of the PRUT Class - two each large marking buoys are carried on each beam on angled launching ramps, whose positioning was modified in the 1970's in the same manner and for the same reasons as in the PRUT Class. The water cannon located on the bridge and on the superstructure deck make it apparent that this ship also has a fire-fighting role.

The KARPATY is assigned to the Northern Fleet. It has no armament and no installations can be noted, which suggest any planned installation of armament,

PART III - SALVAGE SHIPS

In addition to the special ships discussed in Parts I and II, the Soviet Navy maintains a number of salvage ships and ocean-going salvage tugs. Their mission is to assist ships in distress, i.e., to repair leaks, pump out water which has penetrated into the ship, fight fires, perform life-saving missions, and to take disabled ships in tow.

After the end of WWI and the civil war thereafter, a large number of ships in the Black Sea was equipped with salvage gear, in order to perform wreck clearing operations. These wrecks derived less from the operations of WWI, but primarily from the effects of the revolution and the civil war. Every retreat of the Whites or the Reds on the coast was associated with the sinking of ships, insofar as these could not be moved. Clearing these ships had become a vital issue for the Soviet State, because not only did they block harbor entrances and berths, but as well there was a great lack of ships in general, particularly for transport purposes. The shipbuilding, which was in ruins at the time, could not correct this deficiency; both material and technicians were lacking. Therefore the issue was to restore raised ships to operation insofar as possible. In order to be able to coordinate the activities of these salvage vehicles - the majority of them consisted of provisionally equipped lighters, barges and boats and a few floating cranes - a central organization was formed, the so-called "EPRON" (Agency for Underwater Operations). Until 1926, the salvage of a submarine and several surface ships could be counted as successes. The EPRON was based at Sebastopol, where all raised ships were brought for wrecking - to obtain material - when such ships could not be repaired.

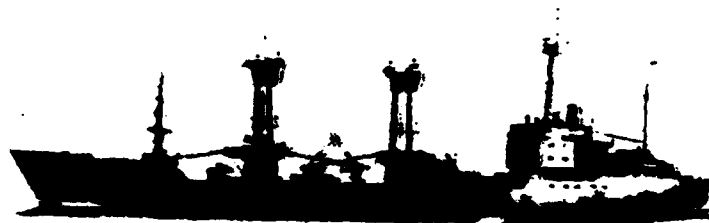


Fig. 5: Salvage ship of the RUDNITSKY Class

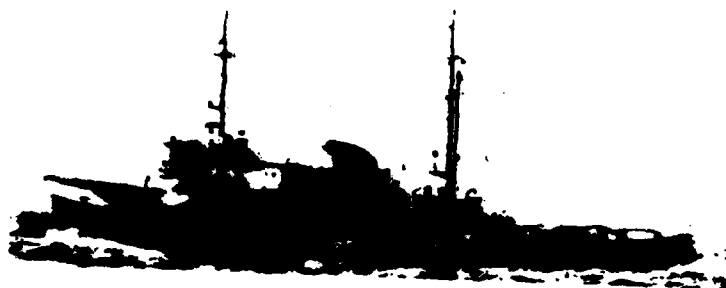


Fig. 6: Salvage tug of the PAMIR Class



Fig. 7: Salvage ship of the INGUL Class



Fig. 8: Salvage tug of the OKHTENSKY Class



Fig. 9: Salvage tug of the OREL Class



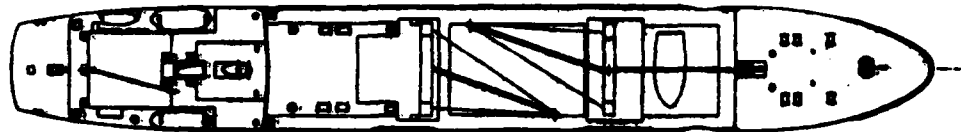
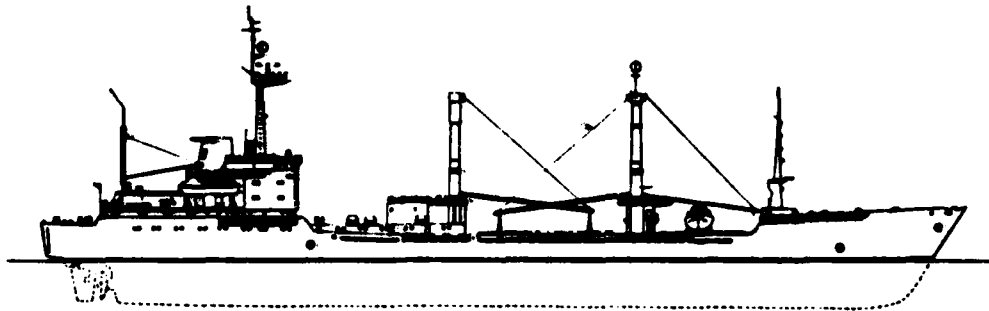
Fig. 10: Salvage tug of the GORIN Class.

In 1928 a branch of EPRON was also established in the Baltic area, which ⁷³²⁰ was based at Leningrad, and later in the area of the Northern Fleet was based at Archangelsk and Murmansk. In the years after WWI the EPRON, which of course was a government agency, but which presumably had a large degree of autonomy, was dissolved and integrated into the Navy; from it the Navy salvage and rescue service was developed, whose ships and assets since that time operate under a special flag assigned to them and whose crews at least to an extent appear to consist of civilian personnel. In addition to it there is another civilian salvage and rescue agency, whose large salvage tugs are in operation on an almost world-wide basis. They can be recognized by the legend "Spasatel" (salvor) painted on the sides of their hulls. To date the ATLANT, OREL, NAPORISTIIY, GERAKL and STROPTIVY Classes have been observed rather often. The more recent of these (from the NAPORISTIIY Class on) are also provided with firefighting equipment.

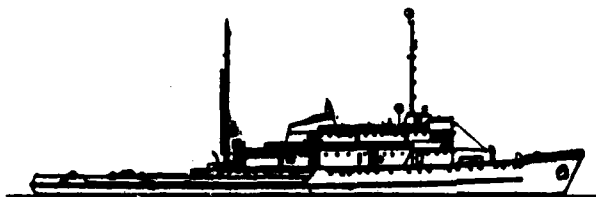
EXTENSIVE SALVAGE CAPABILITIES: THE RUDNITSKY CLASS

In 1979 for the first time a modified standard wood freighter of the PIONER MOSKVY Class operating under the flag of the Naval Salvage And Rescue Service appeared, which initially appeared to present some puzzles. Initially, it was estimated as being either a nuclear tender or a trials ship. However, it was soon determined that it was a special ship for salvage operations. For this purpose a special submersible appears to be provided, which may be carried below decks in the cargo hold. On the starboard side at the level of the bulwark several boat booms in sequence can be noted; apparently smaller boats and ships can make fast to them, when they are working at the rescue site. It could further be noted that an exhaust pipe protrudes from the forward mast. This suggests - as in the submarine tenders of the TOMBA Class, that there is a power plant (generator) in the foreship, whose power is supplied to other units. In addition, on both sides of the foreship and further behind, just before the start of the bridge superstructures, the customary international markings can be noted which advise of the presence of bowthrusters. Such devices are of great importance for a ship of this type, since by means of these devices it can be held exactly at a precise position - at the site of an accident, for example - when a connection to a wreck lying below is established and this connection may not be separated. The most conspicuous external feature of these ships are the two massive portal (double) masts, whose legs are angled slightly inwards. A 40-ton heavy-lift derrick is attached to each of the portal masts, and on the forward portal mast there is also a 20-ton derrick. There is a second 20-ton derrick astern.

Fig. 11: Soviet Salvage Ships And Salvage Tugs (standard scale 1,100)



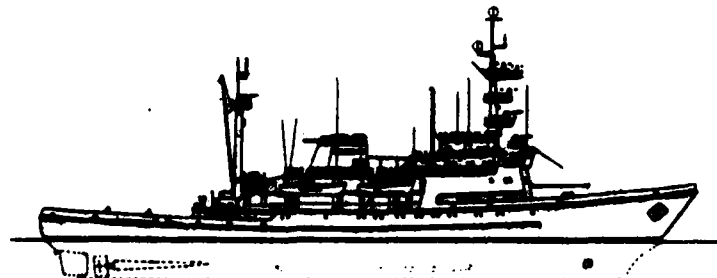
RUKHTSKY CLASS



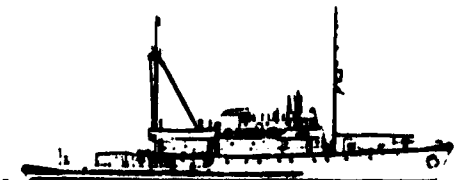
PAMB CLASS



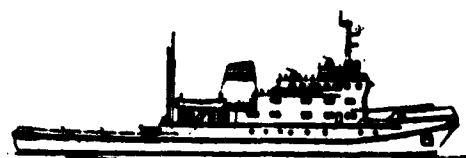
OSKTENSKY CLASS



NGUL CLASS



OREL CLASS



GORN CLASS

Table 4: Soviet Salvage Ships

CLASS	RUBINOV	PAMIR	PELENG	ORP	ORPENERY	OSVET
NUMBER	2	2	2	3	9	4
BUILDING PERIOD	1977-80	1959-60	1973-77	1959-60	1959-60	1973-78
STANDARD DISPLACEMENT	1440	2800	3200	1200	700	2800
OPERATIONAL DPLMT	10000	2800	4000	1700	800	2800
LOA (M)	130.0	70.0	80.0	61.0	47.0	80.0
MAX BEAM (M)	17.0	12.0	15.4	11.0	10.0	14.0
DRAFT (M)	6.0	4.0	5.0	4.0	4.0	5.1
PROPULSION	DM	DM	DM	DM	DM	DM
NO OF SHAFTS	1	2	2	1	1	1
POWER KW (HP)	400 (540)	300 (400)	600 (800)	1200 (1700)	1100 (1500)	2075 (2800)
SPEED	16.4	17.5	20.0	16.0	13.0	13.0
FUEL (T)				200	100	
RANGE (SM/KN)		15000/7.5	500/10.7	10000/13.5	7000/7	
CREW		72	120	37	40	40
ARMAMENT	NONE	NONE	NONE	NONE	NONE	NONE
EQUIPMENT	SUBMER- SIBLE, DIVING GEAR, RESCUE GEAR, GENE- RATOR, TWO PUMPERS	TOWING GEAR, DRAINAGE PUMPS, DIVER EQUIPMENT, DECOMPRES- SION CHAMBERS, FIRE FIGHTING EQUIPMENT	ICE REINFORCE- MENT, TOW- ING GEAR, RESCUE GEAR, BORTHRUS- TER, FIRE FIGHTING GEAR	TOWING GEAR	TOWING GEAR, SOME FIRE FIGHTING GEAR	TOWING GEAR, RESCUE GEAR, FIRE FIGHTING GEAR

This Class consists of two ships, specifically the MIKHAIL RUDNITSKY /320 commissioned in 1979 and the GEORGY KOZMAN, which was delivered in the following year. Both ships were built in Vyborg at the same shipyard which also built the PIONER Class (so named because the names of all twenty units of the class begin with PIONER), e.g., PIONER MOSKVY, PIONER ESSTONIY, etc.), and before this the very similar ZHUKOV Class consisting of twelve units, from which the design of the PIONER Class is derived.

SALVAGE TUGS FROM SWEDEN: THE PAMIR CLASS

Towards the end of the 1950's four large salvage tugs were built at the Swedish Gävle Varv on Soviet order and were completed in 1959/60. Their names are PAMIR, ARBAN, AGATAN and ALDAN. They were designated the PAMIR Class after the lead ship. They have very powerful fixed and mobile pumps, firefighting equipment, diving equipment including a decompression chamber, and a television transmission system which operates up to a depth of 90 meters. Their pump capacity is used particularly for holed or leaking ships; these pumps have a capacity of 4,250 t/h. The salvage divers carried on board can render major assistance in the location and provisional repair of leaks.

Two units, PAMIR and ARBAN, were converted to ELINT/SIGINT ships in 1970/71 and now have the names GIDROGRAF and PELENG; in addition, they have an alphanumeric identification, specifically SSV-480 and SSV-477. In Nato they are listed with the type designator AGI and the code designation PAMIR Class. SSV means "Sudno Svyazyy" ("communications ships"). Both are stationed in the Pacific.

PROGRESS IN NEW DIMENSIONS: THE INGUL CLASS

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In the first half of the 1970's the designs for the largest type of ocean salvage tugs, specially designed for operations in Arctic waters, built to date, were developed. Two ships, PAMIR and MASHUK were built, and in addition two other ships, YAGUAR and BARS, for civilian use. All four ships were built at the Leningrad Admiralty Shipyard; delivery began in 1975. The two first units are distinguished from the two latter units by the fact that to accommodate their operational areas they have a characteristic icebreaker bow, while the others have a protruding bulb at the forefoot. Above the waterline - aside from the completely different paint scheme (marine gray overall for the military version, black hull with white bulwarks and superstructures and red stack in the civilian version), they can be distinguished by the different arrangement of their ship's boats.

All are equipped with powerful pumps, diving and rescue gear (including a fast-deployment "high-line" connection for rescuing crew members of other ships) and firefighting equipment consisting of four cannons for water or foam. The ships are very maneuverable because of the bowthruster system.

*(Conclusion follows in July 1983
Soldat und Technik)*

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